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ABSTRACT

Service learning, an instructional strategy for educators, has the potential to challenge students in diverse ways. It offers students experiential learning opportunities that are personally engaging, are educationally rigorous, require the direct application of knowledge and critical thinking skills, and transform both the community and the learner. Service learning comprises a strong match with what are termed "brain compatible strategies" for the classroom, such as the Multiple Intelligences Theory. The theory of multiple intelligences provides a powerful framework for service-learning practitioners to use in implementing both the service and the learning dimensions of their pedagogy. This booklet addresses the connections between the two. The booklet is divided into the following sections: "Introduction"; "Multiple Intelligences Theory" ("History and Background of Multiple Intelligences"; "Definitions of Eight Intelligences"; "Key Points in Multiple Intelligences Theory"); "The Elements of Service Learning" ("Definition of Service-Learning"); "Service-Learning Working with Multiple Intelligences" ("Elementary School"; "Middle School"; "High School"); "The Eight Intelligences as Eight Paths to Service"; and "Conclusion." (Contains 14 references.) (BT)

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LINKING LEARNING WITH LIFE

Pondering Learning

Connecting Multiple Intelligences And Service Learning

SO 033 024

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Pondering Learning

Connecting Multiple Intelligences and Service-Learning

by

Carole Klopp

Pamela Toole

and James Toole

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National Dropout Prevention Center
College of Health, Education, and Human Development
Clemson University
209 Martin Street, Clemson, SC 29631-1555
Telephone: 864-656-2599
e-mail: ndpc@clemson.edu
www.dropoutprevention.org

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Introduction

For over 20 years, we have been asking groups of educators, as well as high school and college students, to describe their most meaningful learning experience during their K-12 schooling. Year after year we have heard similar responses to this question. First, there is always a small group who cannot remember one meaningful experience. Perhaps there is no more powerful indictment of an education than that it never inspired or moved students in some deep way. But what did the others say?

The majority of people repeatedly use the same descriptors. The learning was active, not passive. The learning transformed not only what they knew, but also how they saw the world. It inspired new interests. The experiences impacted their beliefs in themselves both as learners and as people capable of making a difference. People reported being challenged and stretched to meet high expectations of their capabilities. Their opinions and voices mattered. Often what they did was directed not primarily towards a grade, but towards some audience or need beyond the classroom. And, almost always, self-esteem had increased and usually social competence. In other words, education had transformed both what they knew and who they were.

Two things strike us about these accounts. First, these meaningful experiences frequently required students to utilize what Howard Gardner (1983) has called "multiple intelligences." Unlike a more narrowly focused worksheet or essay exam, these tasks elicited and engaged a much broader range of students' abilities. Secondly, these experiences tended to strongly correspond with the methodology of service-learning. We think that this is not just a coincidence! Service-learning, an instructional strategy for educators, has the potential to challenge students in diverse ways. It offers students experiential learning opportunities that are personally engaging, are educationally rigorous, require the direct application of knowledge and critical thinking skills, and transform both the community and the learner. We are convinced that service-learning is one of the most powerful instructional strategies available to educators and that it comprises a strong

match with what are being termed "brain compatible strategies" for the classroom, such as the Multiple Intelligences Theory.

Multiple intelligences theorists believe that the traditional format of education overemphasizes what they call verbal/linguistic (word smart) and logical/mathematical (number smart) intelligences. Other important talents that students possess and that have real-life application are often forgotten and left latent. If teachers are to change this, then they will need teaching strategies that require the participation of a wider set of "intelligences" (i.e., musical, spatial, interpersonal, intrapersonal, bodily-kinesthetic, and naturalist).

Service-learning is just such a strategy as it involves addressing genuine community needs that create meaning and relevance for students in the classroom. It might involve activities as diverse as cross-age tutoring for students, park restoration, water monitoring of rivers, building housing for low-income families, advocating for needed street lights, acting as a docent at a local museum, or conducting and publishing oral histories with senior citizens. In service-learning, what these activities have in common is that they meet a need identified by the community (service) as they simultaneously address classroom-teaching objectives (learning). What they share with the multiple intelligences is that students are asked to utilize many different learning styles in order to complete the project.

The nature of these real-life projects is that they pose challenges that require creativity, problem solving, and are not necessarily neatly laid out. Textbook information/learning alone can assist in solving these dilemmas, but rarely are all of the answers found in one chapter or even in one book. With service-learning, educators do not have to create "simulations" that utilize or help develop the eight intelligences because "taking the theory to practice" is automatically built into solving these community needs. The nature of the learning task requires critical thinking, diverse strategies, a range of resources, and multiple intelligences to be successful.

By expanding what is asked of students, service-learning benefits students' education in three ways. First, many more students will have the opportunity to shine as more types of intelligence are recognized and required to succeed. Existing talents will be tapped that were invisible in more narrow educational environments. Secondly, students will have increased opportunities to discover and expand new abilities that they might never have known they possessed. Thirdly, students will be more likely to acquire skills that will make them successful adults.

Gardner built his theory around the intelligences that people require to create successful real-life performances. For these reasons, it is common for students who have seldom felt successful or intelligent in more passive learning situations to experience a new feeling of capability and self-worth through service-learning.

The theory of multiple intelligences provides a powerful framework for service-learning practitioners to utilize in implementing both the service and the learning dimensions of their pedagogy. At the best level, the practices of service-learning and the multiple intelligences have a great deal to offer and complement each other. The purpose of this guidebook is to point out and illustrate the compatibility and potential reciprocity of service-learning and multiple intelligences. We believe that many of the core assumptions of each overlap, and in the real world of classrooms, one strengthens and draws from the other. Gardner's theory implies that schools need to do a much better job of identifying, nurturing, and affirming not only how smart children are, but in which ways they are smart. Without his theory, we risk losing not only our students' self-realization of their own talents, but also the contributions (i.e., service) those talents might offer the world!

Service-learning is a method for educators to employ that affirms and speaks to the many different ways that children can learn, achieve, and contribute. In effect, it speaks to their multiple intelligences.

Multiple Intelligences Theory

Do you remember anyone in your high school who was the class clown, the rebel, or the social reject who later became a great success professionally? Historically, successful performance in school and successful performance in life have not always been synonymous. People like Pulitzer Prize winning author John Steinbeck, Microsoft founder Bill Gates, and McDonald's founder Ray Kroc each dropped out of either high school or college but would have been hard challenged to be more successful than they have been. In a similar way, parents of many famous or successful individuals have been told that their children did not have great academic promise and they should lower their career aspirations for their child...only to find the reverse to be true as that child matured into an extremely successful adult.

How is this possible? The traditional educational system and classroom instruction have long favored students who were good with words and/or numbers (what has been called verbal/linguistic and mathematical/logical intelligence). This has created a built-in bias against students who learn in other ways and have different types of talents. Howard Gardner, a Harvard professor of education and psychology, believed that our very notion of what it means to be intelligent was severely limited. He saw intelligence as much more than a single fixed ability measurable by a solitary test. In 1983, Gardner published his groundbreaking theory in *Frames of Mind* that continues to challenge how we view intelligence, our assessment of children's abilities, and our design of classroom instruction. What Gardner created was a new conception of intelligence that he referred to as the "Multiple Intelligences" people possess and utilize to succeed and contribute in life. Gardner's work preceded some of the current findings about the brain. It was, however, deeply influenced by brain biology and continues to be confirmed by much of the latest research showing that intelligence is complex and not related to a single dimension.

History and Background of Multiple Intelligences

The original idea of a single IQ score came from the work of Alfred Binet who was asked to develop a test to determine which elementary students were at risk for failure and should receive remedial instruction. This concept of a single test for intelligence rapidly gained acceptance amongst educators and psychologists with various derivations developed on the same theme—a simple test to rate intelligence. Gardner felt this method of defining intelligence was simply too narrow. It was based on a paper and pencil test that asked about isolated tasks (some of which children may never have done before) and which all required either verbal/linguistic skills or logical/mathematical skills. Gardner spent years studying cognitive development at Boston University School of Medicine, as well as working at Boston's Veterans' Administration with victims of brain injury and with Harvard's Project Zero. He had the opportunity to work with a large range of people, including gifted and brain-damaged individuals. One of his key realizations was that people who had strokes or other severe head injuries could lose one or several of their abilities, but still remain proficient in others. That was a beginning seed for his later work on multiple intelligences. He realized that you do not just have just one intelligence. For instance, after a stroke, a person might lose his ability for music and singing, but still talk fluently.

Gardner had a second entry point to developing his theory of multiple intelligences. He also studied the nature of problem solving. He was fascinated with the decision-making processes that occur before action takes place. How does a concert violinist decide on a particular sequence and select the techniques that enthrall her audience? How do surgeons make decisions when unexpected complications occur during a routine surgery? How does a potter know just when to start shaping the clay and how much pressure to apply to get the desired results? He also believed that we could learn what it means to be intelligent by studying a culture's exemplars of work in each of eight areas that he came to call intelligences. Gardner concluded that intelligence had

more to do with the capacity for 1) solving problems and 2) fashioning products in rich and natural settings, than with the answers found in a paper and pencil test. He had a set of criteria that had to be met in order for an ability to be considered an intelligence. For Gardner, then, the basic question became not "How smart are you?," but "In which ways are you smart?"

The common characteristics that each of the eight intelligences share are:

- Potential of isolation by brain damage
- The occurrence of savants, prodigies, and other exceptional people
- A distinctive developmental history with a set of end-state performances
- An evolutionary history that can be traced
- Support from psychometric findings
- Support from experimental psychological tasks
- A core set of operations
- The potential for encoding in a symbol system

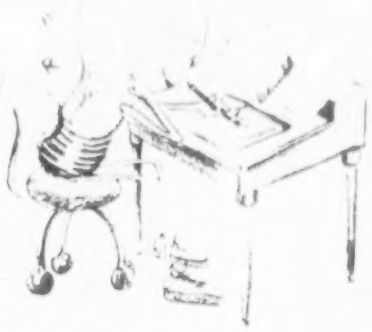
(From *The Pocket Guide to Multiple Intelligences*,1998)

His theory is a framework for looking at the many different ways in which humans learn and contribute to the world in which they live. In fact, it is clear that some ways of learning probably do not lend themselves at all to paper and pencil tests. Gardner states *"MI theory assumes that all students have available, for stimulation, the entire array of human intelligences. Each intelligence can be cultivated. At the same time, it is recognized that, for a variety of reasons, students exhibit different profiles of intelligences, and that certain intelligences will be more 'at promise' in each student. In addition to each student exhibiting a particular profile of intelligences in isolation, students also demonstrate intelligences when they are working with their peers.... Groups of 'cooperative' learning provide an excellent milieu in which students can both discover their peculiar strengths and learn to work effectively with others to multiply the collective intelligence of the group."* (Gardner, 1993)

Definitions of the Eight Intelligences

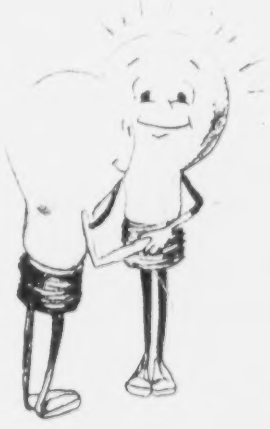
Gardner initially proposed that we had seven intelligences: verbal/linguistic, logical/mathematical, musical/rhythmic, visual/spatial, bodily/kinesthetic, intrapersonal, and interpersonal. Over a decade later, he added an eighth intelligence which he calls the naturalist. Let's take a moment to review what Gardner calls the Eight Multiple Intelligences.

- Verbal/Linguistic Intelligence (Word Smart). The Verbal Linguistic Intelligence is concerned with the use of language and all the complexities that accompany this such as sounds, meanings of words, structure, and styles of language. People with this intelligence can often communicate effectively through speaking and writing, and they are typically strong readers and listeners as well as debaters. They may have a passion for things like poetry, humor, storytelling, debating, and creative writing.



- Logical/Mathematical Intelligence (Logic Smart). This intelligence is associated with what we call "scientific thinking" and mathematical reasoning, including the forming and testing of hypotheses, deductive/inductive thinking, manipulating numbers, and the recognizing abstract patterns. Such people are good at figuring things out, analyzing things, and solving problems in subjects like math and science. They probably enjoy figuring out patterns, matching things that are alike, crossword puzzles, brain teasers, and "building models and theories that can describe and eventually explain the operation of the world" (Gardner, 1983, p.145).

- Intrapersonal Intelligence (Self Smart). Intrapersonal Intelligence involves a deep sense of understanding yourself, your strengths and weaknesses, your feelings, and the capacity to be self-reflective. People with this intelligence may be good at setting goals, may like meditating, assessing situations, and monitoring their own thinking. Other people will often describe themselves as having a strong sense of "self."



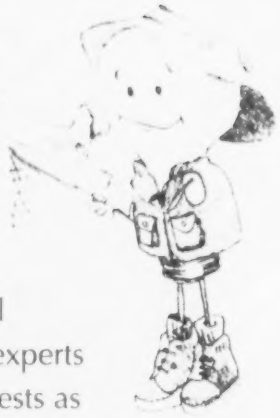
- Interpersonal Intelligence (People Smart). Interpersonal Intelligence is characterized by the capacity to understand others and the fine nuances of their moods, feelings, body language, and motivations. It also includes a strong capacity to communicate both verbally and nonverbally with others both in groups and one to one. People with this intelligence are also good at sharing their opinions, and demonstrate a heightened sense of understanding the personalities and feelings of others.

- Visual/Spatial Intelligence (Picture Smart). Visual/Spatial Intelligence involves the ability to create internal mental pictures and to comprehend the visual world. People highly developed in this intelligence are good at creating pictures in their mind. Whether it is by illustrating those images (as in the case of an artist) or mentally conceptualizing the images (as in the case of an interior designer), such people demonstrate the intellectual capacity of seeing beyond two-dimensional limitations. These people may also demonstrate sensitivity to colors, shapes, lines, and images. They may like to draw, paint, sculpt, design and/or visualize and imagine things.

- Musical/Rhythmic Intelligence (Music Smart). People who are strong in the Musical/Rhythmic Intelligence may be musical themselves or keen listeners who are appreciative of fine music. They are sensitive to tone, beat, pitch, sound, melody, and tempo. They have the capacity to literally think in music. Such people enjoy things like singing, playing musical instruments, beating drums, humming, writing songs, and performing. This intellectual capacity is often revealed in people who appear to easily remember the lyrics to songs, the beat of popular tunes, or are easily given to humming tunes and composing melodies.

- Bodily/Kinesthetic Intelligence (Body Smart). The Bodily/Kinesthetic Intelligence includes the ability to use the body to express emotion and to have grace and control in motion in areas such as dance and sports. People strong in this intelligence learn well by doing. They are often gifted with their hands and skilled in building and inventing. Two seemingly extreme professions share this intelligence: the professional athlete who magically dribbles, passes, or shoots a basketball; and the surgeon who maneuvers her hands performing complex surgical techniques. They may also use their body to put on a production for others through being an actor or a mime.

- Naturalist Intelligence (Nature Smart). The Naturalist Intelligence refers to the ability to recognize patterns and classify plants, animals, minerals, and other parts of the natural environment like clouds or rocks. Such people are able, often at an early age, to



recognize artifacts and identify natural objects. They can live in natural settings and are good at analyzing data from nature. They often like hiking, camping, fishing, digging for fossils, or other activities related to the natural environment. This intelligence may be revealed through the interests of children who become experts on dinosaurs and adults who pursue such interests as hunting, botany, and anatomy. A highly developed Naturalist Intelligence was valued culturally by the Native Americans who lived in harmony and understanding with nature.

Key Points in Multiple Intelligences Theory

The following represents key aspects of Multiple Intelligences Theory as described in Thomas Armstrong's book, *Multiple Intelligences in the Classroom*, (1994, pages 11-12).

- Each person is born with the potential for all eight intelligences, but due to cultural influences, heredity, and personal life history, each of those intelligences may be fully developed, partially developed, or forgotten.
- We can all grow in each intelligence to an adequate level of competency.
- These intelligences work together in complex ways, and there is a range of ways to be intelligent within each intelligence.
- Any topic of importance from any discipline can be taught using more than one intelligence to reach more students.

It is essential to keep these points in mind as we think about the actual workings of the *learning* brain. The Multiple Intelligences Theory represents one aspect of the learning process. It is extremely important, however, to consider the total process involved in learning. The neurons in the brain constantly seek meaning and sense through

context and pattern-making as a result of experience and emotions in order to learn. Neural plasticity is the neuron's lifelong ability to change structure and chemistry in response to new experiences and is an extremely important concept to understand in the learning process. Because children are constantly growing and changing, they require multiple stimuli to encourage this pattern-making or plasticity of many neurons. Neural growth and plasticity can be limited by a lack of experiences and a sameness to experience. Thus, when we look at how our students learn, we find that, particularly for children whose neurons are rapidly changing and growing, no one method of instruction is perfect. Many different ways of teaching should be utilized to reach all students and to enable them to "exercise" all of their intelligences. As previously noted, each of the eight intelligences is found within all human brains. The difference lies in the degree to which a person is proficient or "gifted" in a particular intelligence.

Now, think of your experiences as an educator keeping multiple intelligences in mind:

- Have you ever had to teach something using more than one approach before your students seemed to grasp the concept?
- Have you ever watched a student who struggled with verbalizing his thoughts or solving math problems, absolutely shine when given an opportunity to create a song or to act out what he was learning in such a way that he could create body movements that demonstrated the concepts?
- Have you ever found yourself thinking that one of your students was born to speak, or born to sing, or born to understand the natural world?

Most educators have had these experiences and now, based on neural research, we can validate what many teachers have innately understood—the differences in their students' learning styles. So, as we ponder the meaning of each intelligence and the learning process,

let's put it in context with the elements of service-learning as a teaching strategy. In *which* ways can the pedagogy of service-learning serve as a way to reach more than one of our intelligences? If service-learning is truly a strong teaching methodology, then it is important to match the practice with the brain/learning research to determine compatibility and efficacy. This is a first effort at doing just that. We continue by reviewing the components of service-learning in order to facilitate our discussion.

The Elements of Service-Learning

Over the past decade, educators have come to be able to clearly distinguish between the practice of community service and the practice of service-learning.

Definition of Service-Learning

There are over 150 definitions of service-learning available for perusal on the Internet. The following definition is from the federal legislation that defines service-learning as an educational method:

- under which students or participants learn and develop through active participation in thoughtfully organized service that is con ducted in and meets the needs of a community;
- which is coordinated within an elementary school, secondary school institution of higher education, or community service program, and with the community;
- which helps foster civic responsibility;
- which is integrated into and enhances the academic curriculum of the student, or the education components of the community service program in which the participant is enrolled; and
- which provides structured time for the students or participants to reflect on the service experience. *(National and Community Service Trust Act, 1993)*

Embedded within this definition are all the elements of service-learning as a methodology for teaching. Let's review them quickly and look for ways in which they include multiple intelligences.

- Student Ownership or Youth Voice. One of the major components of service-learning is the process of empowering youth voice and ownership in the learning activity. This relates to the brain's need to make sense, give meaning, and attach emotions to a learning activity. Students might have responsibility over any number of aspects of the learning process, including determining the community need, the choice of service, the project design, or

how to assess their own work. This component requires strong verbal linguistic skills. If teachers created and handed out a service "assignment," then students could sit passively or ask only what was required to get an "A." But when they have to interact with and survey school or community members to identify genuine needs, negotiate with other class members about the best solutions, and develop partnerships with the community, language is everywhere. Such authentic language environments challenge and expand students' verball/linguistic intelligence as they are required to question, propose, collaborate, persuade, document, present, and evaluate. *The student design and implementation of any part of the project could potentially draw on any of the multiple intelligences.*

- Genuine Community Need. A critical component of the methodology is the process of determining just what "community need" is to be served. Students must understand who is being served and what the genuine need is. This relates to the brain's need for meaning or "why am I doing this? Will I make a difference?" It provides the "glue" for the learning process in terms of personal commitment to both the service and the learning that must take place for the service project to happen. The community being served should determine the need. It should not be imposed or determined by people who are not familiar with the community. It involves an attitude of "service with," not "service for." This process may require conducting a survey or interviews of community members as well as self-reflection about the community. *This component calls for logical/mathematical, verbal/linguistic, interpersonal, and intrapersonal skills.*

- Curricular Connection. As previously mentioned, students must have a thorough understanding of the learning objectives associated with the project, particularly those learning objectives that are connected to standards and classroom curricula. To date, many states have summarized various service-learning projects and noted

the state standards that have been "exercised" through the completed service projects undertaken by the students. In the projects described in this guidebook, the curricular objectives are clearly defined for the reader. It is useful to note here that most service-learning projects will involve an integrated curricular effort, always involving more than one discipline and addressing more than one state standard. In fact, *all eight intelligences can be developed and utilized depending upon the particular project.*

- Reflection. Reflection consists of the use of creative and critical thinking skills in order to prepare for, think about, and learn from the service-learning experience. Perhaps the most important aspect of the process and the key to the "learning" in service-learning, reflection provides teachers with the opportunity to cement the real learning for students through the use of what neuroscientists term "elaborate rehearsal" or the use of higher-order thinking skills to promote long-term retention of the material. By taking the time to reflect before, during, and after the service-learning, students are afforded a chance to internalize and broaden their learning and to help the neurons make the necessary connections or patterns. The ongoing process of reflection is absolutely key as a component of service-learning and should involve a variety of methods such as writing, drawing, doing, telling, and showing. *All eight intelligences are mobilized when strong reflection is utilized during the teaching/learning experience.*

- The Service. This would encompass the entire process from design and preparation through implementation to evaluation and celebration. Imbedded in this process are all of the skills and learning that must take place, active service, a commitment to making a difference, and both the rote and elaborate rehearsal necessary for long term retention. *All eight intelligences may be drawn upon in the course of preparation, design, implementation, evaluation, and celebration.*

The following chart represents the correlation between the multiple intelligences and the elements of service-learning.

Service-Learning Component	Word Smart	Logic Smart	Picture Smart	Self Smart	People Smart	Body Smart	Music Smart	Nature Smart
Youth Voice	X	X	X	X	X	X	X	X
Genuine Community Need	X	X		X	X			
Curricular Connection	X	X	X	X	X	X	X	X
Reflection	X	X	X	X	X	X	X	X
The Service	X	X	X	X	X	X	X	X

In the next chapter, we will take a look at service-learning in action — three examples of actual service-learning projects and their connections to the multiple intelligences.

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Service-Learning Working With Multiple Intelligences

In order to more strongly illustrate the connection between service-learning and the multiple intelligences, we have chosen to use three samples from the K-12 education world: an elementary school, a middle school, and a high school. These samples represent actual service-learning projects/curriculum used in the schools. The activities that address some of the eight intelligences are far more rigorous than others. For instance, the music example for all three could be stronger. This highlights the fact that every project may not address every intelligence, and curriculum should not be stretched or contrived in clumsy ways.

Elementary School

Fourth grade students were allowed to select a project that could strengthen the bond between the school and the community in which they lived. They wanted to create something that would be a gift to the community at the same time they were learning history. Since fourth grade history focused on state history, it was a nice match to create a local history book.

The students were matched with senior citizens from a local service club, and together they created a book. Twenty local landmarks were selected as possible items to be researched, and 15 were selected by the students for the book. Students were divided into 15 groups with each group assigned a senior citizen as their service partner. Students and seniors took two bus trips to photograph landmarks and visited the local Historical Society where they interviewed the director and looked at materials. Two interview fairs were held where community members who possessed historical knowledge or special memories of the landmarks were invited to share their knowledge. Students had prepared questions and used a tape recorder to conduct their interviews.

This collaboration in the creation of the local history book encompassed interviewing, researching, reading, writing, revising, editing, layout, illustrating and demonstrating. The teachers commented that they had "never witnessed such determination on the part of our students to achieve a goal" as they saw evidenced with this effort. Let's review the

project now through the "multiple intelligences" lens:

- Word Smart. This intelligence came into play frequently with the writing of the book, interviewing senior citizens, and reading history accounts.
- Logic Smart. During the project, students played chess and other problem-solving games as they interacted with senior citizen partners.
- Picture Smart. Clearly setting up the layout of the book, taking pictures, and doing the illustrating played a singular role in exercising this intelligence.
- People Smart. Woven throughout the project, students spent time talking with their senior citizen service partners and working with their service team interviewing people.
- Music Smart. During the final celebration of the project, music was a key component of this activity.
- Body Smart. All the touring and walking the town to survey the landmarks and experience the historical places clearly addressed the kinesthetic learners. While not totally "intellectual," the kinesthetic needs of many students were met through this physical learning activity. Students also had to demonstrate what they learned through models and role-plays—once again moving and doing.
- Nature Smart. Two of the projects involved two parks that were historic landmarks in the town. Students had to thoroughly research the history of the parks, including the biological aspects of the parks. Woven throughout the project, students spent time talking with their senior citizen service partners and working with their service team interviewing people.
- Self Smart. As the students reflected on the process of creating the book and documenting their memories, they created self-knowledge and grew in self-esteem through a project well done.

Middle School

Students and teachers in this middle school decided that a real community need and service would be the cleanup of a river that is one of the main recreational areas in their community. The students agreed that this cleanup was necessary, determined the design of the project, contacted the National Park Service and the state Department of Natural Resources in order to coordinate efforts with the two agencies, and worked with the teachers to gain the knowledge necessary to complete the project. In total, students worked on clean-up, water analysis, and looked at ecological balance.

With that as the goal, students and teachers together mapped out the logistics of the project and its connection to established curriculum. An historical review of the area was undertaken which included a look at the environmental issues that have plagued this area for a while. In science, students studied how to do water quality testing, how to identify species habitat for preservation purposes, orienteering, and how to gather information from a scientific basis. In mathematics, students utilized angles to learn the art of orienteering, how to calculate volume to determine the river's flow, how to make scale models, spreadsheets, and charted/graphed the information learned from studying the river for preservation purposes.

Project preparation was undertaken by students in a variety of classes and through designated committees for the project. Special education students were involved in the project to design the scheduling of the project and determine the menu for the meals to be eaten on site. Through their physical education classes, students learned how to snowshoe, canoe, cross-country ski, develop a fitness trail, and they underwent survival training as an adjunct to learning about survival in the natural environment.

Reflection was a constant in the forms of poetry, drama, videos, watercolors, snow sculptures, photography, and the development of a web site—in addition to daily journaling of activities. Music was used as a way to celebrate and share the project with the community

through a student community music concert. Let's now view the established curriculum through the eyes of the multiple intelligences.

- Word Smart. A wide variety of writing was created in relation to this project including poems, daily journals, and letters. Students also wrote and performed skits on conservation themes that were videotaped. These activities clearly took advantage of students high in this intelligence, but also had all students exercising this intelligence as well.

- Logic Smart. Again, a wide variety of exercises were woven into the project to strengthen and enhance this way of learning including: calculating volume, making scale models, doing spreadsheets of the collected data on the river as well as charts and graphs, and orienteering using bearings and angles. Technology was heavily used including having students gain an understanding of the concept of global positioning for orienteering and cartography.

- Picture Smart. Students creating videos, doing skits, orienteering —in all cases, they had to utilize this intelligence in order to successfully perform. When on site at the river, students had to pay particular attention to the visual as they performed analysis of not only the river, but of the environment surrounding the river. In the classroom/lab, students utilized computers to develop PowerPoint presentations, do film editing, and create an attractive web site to chronicle their work.

- People Smart. This intelligence was exercised every time all the students were put into groups to chart the water, to do skits, to go orienteering, and when they were on site at the river clearing garbage and reclaiming the land working together in teams.

- Music Smart. In conjunction with the project, the music classes learned and performed a concert using music with a "river" theme in order to celebrate and share the project with their local community.

- Body Smart. The actual on-site explorations of the river ecology exercised this intelligence. However, teachers added to this by having the physical education class concentrate on teaching canoeing, snowshoeing, cross-country skiing, a survival unit, and development of a fitness trail. In addition, the orienteering efforts and the performance of the skits also utilized the body movements necessary for this intelligence. Students had ample opportunity to "move" in this project!

- Nature Smart. Given the nature of the project, that of a river clean-up and park land restoration, this intelligence was constantly being given an opportunity to be utilized by all involved. Even if students had only a marginal strength in this area, that strength was increased due to the constant attention being given it through this "naturalistic" service project.

- Self Smart. In this project, each student was individually challenged to grow as a result of the project process which required each student to take the initiative and perform on an individual basis during various parts of the project. Additionally, through the reflection process, each student came to understand the dramatic impact this project had on their community as well as the environment.

While all projects do not necessarily provide the opportunity for such extensive use of the multiple intelligences, given the integrated nature of service-learning, it is common for many projects to look like this one. Let's move on to an example from a high school.

High School

In this particular project, the reclamation of a downtown area was determined to be a high community need by the students in a high school art class. The reclamation took the form of a wall mural that would be designed and painted by the students in order to beautify a particular section of a building in the downtown area of this community.

Students determined what the mural would represent and planned the project from beginning to end.

In the planning of the design, students decided to depict the history of their community using many different aspects of their local culture. As the planning progressed, students realized that this project would involve a variety of classes including science, mathematics, language arts, and music in addition to the art class where the project began. Students had to learn how to mathematically transfer a design done on a 10 x 13 sheet to the wall of a building. Additionally, students had to learn in chemistry class information about the composition of paints, how to combine paints, which paints would last, and how to chemically preserve the colors in their mural for a long period of time. Because students had to do presentations to local government boards and personnel as well as to local businesspersons, it was important that they practice public speaking and writing.

Reflection was ongoing in the forms of journaling, photography, drawing, testing, small group discussion, and portfolios. Working in teams, students created the mural over a three-year period.

An unexpected benefit occurred with this project in the revitalization of a downtown that had been dying as businesses had left for other venues over the years. As the students' "beautification" project progressed over a three-year period, downtown building owners began to renovate their buildings in order to complement the work of the students. This renovation and clean-up brought small businesses back to the downtown area, and local community members began to shop and frequent the downtown, as had been the habit in years gone by. When, at the end of the three years and with the completion of the mural, students and community celebrated with an outdoor concert, this community found a renewed civic pride in their downtown and their community. Let's now review this service-learning project with the multiple intelligences in mind.

- Word Smart: As indicated previously, all students had an opportunity to exercise this intelligence through journaling, writing about the history of their town, and through making presentations to local businesspersons and government officials.
- Logic Smart: The use of this intelligence was vital to the preparation, implementation, and completion of this project. All the involved students had to understand the mathematics behind the transferring of the mural from design to reality and the chemistry behind the use of the paint for longevity purposes. Students were constantly growing in this intelligence as the project progressed.
- Picture Smart: Given that this project was focused on the arts, it is clear that this intelligence played a huge part in the project and was constantly being reinforced in all of the participating students. Since the project lasted for three years, the art teacher found her class growing by leaps and bounds until, in year three, there was a waiting list for students to be a part of this project. Clearly, this project, while easy for those with this dominant intelligence, drew students who had not previously evidenced any significant talent in this area and reinforced any inclinations they had.
- People Smart: Students worked in teams from research to design to surface preparation to painting. This was a project where everyone had to work well together in order to accomplish the task in a timely manner.
- Self Smart: While one would not necessarily document this intelligence, it is obvious that the self-esteem of all the students was reinforced as they saw their community move to complement their efforts through the other renovations that happened as a result of their project. Students who began the project and moved on to college or jobs, returned for the final celebration of the mural, proud of their accomplishments and those of their community.

- Music Smart. As a strong celebration/reflection activity for this project, music was integral to the community "party" that was held to commemorate this town event.
- Body Smart. While students involved in this project would not necessarily think of this as a kinesthetic effort, this project definitely called upon each student's ability to climb and paint and to do it for more than an hour at a time. It required a painter's dexterity and range of motion. Clearly students were exercising this intelligence constantly in this project.
- Nature Smart. As part of their mural, students studied the natural environment in order to depict it in the mural—which was painted outside, of course. This was an important part of their effort and claimed as much of their attention as did the study of design and paint chemistry.

This integrated service-learning project again reveals how students can exercise all of their brain capacity, not just one area. Even more importantly, students must integrate the multiple intelligences in a single performance, just as adults must do on a regular basis.

The Eight Intelligences as Eight Paths to Service

There is one more element that we haven't mentioned yet. Providing this type of education also satisfies the brain's need for patterned, integrated learning that is connected to emotions. Brain research is finding that information that is tied to *emotional* meaning is far more apt to be retained. This connection to emotions is a key element in the learning process that we have not stressed so far, but which we feel is indispensable to all that we are saying. In fact, the more that is learned about learning and the emotions, the more educators must be aware of the integral and essential part that emotions play in the learning process.

David Sousa (2001) writes in his book, *How the Brain Learns*, "how a person 'feels' about a learning situation determines the amount of attention devoted to it." He continues by saying "emotions interact with reason to support or inhibit learning." So, as we continue to ponder learning via the multiple intelligences and service-learning, we would like to pose another venue or manner of looking at the multiple intelligences—through the concept of service as an "emotional vehicle" for learning by itself. Let's take a few minutes to look more closely at this concept.

Which of the eight intelligences seem to come most naturally to you, and have you found ways to use those intelligences to help others? Although we often think of people coming together because of needs, Northwestern University professor John McKnight points out that the most vital communities are those built on gift-giving. People's talents are needed and stretched to make a difference. From this perspective, the eight intelligences might be viewed as eight gifts that people have to share with their communities. The eight intelligences become eight paths to service. As a person begins to recognize and expand their special intelligences, they open new possibilities for service.

People who have a high degree of naturalistic intelligence can help us appreciate and preserve our environment. Rachel Carson used this gift to warn people of the heretofore unknown dangers of pesticides in

Silent Spring. People with a high degree of verbal/linguistic intelligence can utilize their gift to provide inspirational leadership. Winston Churchill used this gift to raise the spirit of the British people in the darkest days of World War II. People who have a high degree of intrapersonal intelligence can help us to deepen our understanding of life and its meaning. Gandhi used his intrapersonal intelligence about the inner, spiritual nature of people to give shape and teach a philosophy of nonviolence and love that freed India from colonial rule. The message for service-learning advocates is that as we nurture multiple intelligences, we support both individual potential and the common good.

On the following pages the eight intelligences are charted with examples of service roles in which special gifts might be utilized. In the third column are people who did or continue to make a difference through the intelligence sited. Not all of the names may be familiar, but think of people whom you believe have used that intelligence to make the world a better place.

Thinking about the eight intelligences has caused us to reflect about the nature of service vis-à-vis the multiple intelligences. The people listed provided direct, public, visible service to others. We can hypothesize that if educators utilize service-learning consciously, the common good will be multiplied tenfold.

Intellegence	Sample Service Roles	Famous Individuals
	Word Smart Advocacy, story telling, writing, speaking, poetry, teaching	Maya Angelou William Shakespeare Laura Ingalls Wilder Elizabeth Cady Stanton Martin Luther King
	Nature Smart Environmental advocacy, classifying artifacts	Rachel Carson John Muir Diane Fossey Sacajawea Charles Darwin
	Logic Smart Graphs, inventions, computer programs, water testing	Jonas Salk George W. Carver Marie Curie Thomas Edison Bill Gates
	Picture Smart Painting, murals, sculpting, interior or exterior design, graphics	Pablo Picasso Diego Rivera Michaelangelo Maria Montoya Martinez Frank Lloyd Wright
	Music Smart Singing, composing performing	Paul Robeson Woody Guthrie Yo Yo Ma Peter, Paul & Mary Beverly Sills

Intellegence	Sample Service Roles	Famous Individuals
	Body Smart: Building, coaching, juggling, athletics, surgery, creative dance, and drama	Alvin Ailey Scott Hamilton Lily Tomlin Jackie Robinson Ben Carson, M.D.
	People Smart: Team work, giving feedback, communicating, collaborating, facilitating	Caesar Chavez Maria Montessori Harriet Tubman Eleanor Roosevelt Princess Diana
	Self-Smart: Research author, goal setting, reflection, journaling, inner-life	Mahatma Gandhi Carl Jung Thomas Merton Helen Keller Oprah Winfrey

Conclusion

We hope this has whet your appetite to explore more about the brain, learning, intelligence, and the marvelous contribution that service-learning can make to educating children. Service-learning is a strong pedagogy—one that resonates with both students and adults as they work together to make their community a better place while simultaneously bringing reality to concepts found in books.

But, we would be remiss if we did not include this caveat—***learning*** *is about more than just the multiple intelligences.* It is about the whole brain, and what it means to learn. Neuroscientists are discovering more every day about the intersection between logic, emotions, experiences, and the learning process. Scientists and educators continue to explore and learn more every day about the left and right hemispheres, modalities (audio, visual, kinesthetic), and any number of different ways that learning can be defined. The eight intelligences do offer a critical framework to help education, but there is much more to this wonderful thing called learning. We close with Gardner's words (Fall, 1993) which envision the wider horizons of our work centered on learning, intelligence, and service:

Understanding the nature of the human mind in all of its complexity is no mean feat, and a complete understanding may well exceed human investigative capacities. But understanding intelligence—and even knowing how better to develop it—does not suffice in itself. Any human capacity can be used for ill as well as for good; and it is part of our responsibility as human beings on a single troubled planet to try to use our competences, our intelligences, in morally responsible ways. This assignment cannot fall exclusively on the shoulders of researchers; but nor can we simply afford to pass this responsibility on to others.

The human being is also more than his or her intellectual powers. Perhaps more crucial than intelligence in the human firmament are motivation, personality, emotions, and will. If we are ever to obtain a comprehensive and fully integrated picture of human beings, we need to meld our insights about cognition with comparable insights in respect to these other aspects of the human being. Perhaps, indeed, a

different view of human nature will result from this activity of synthesis. Obviously so grand an undertaking requires the highest degree of "distributed collaboration" among researchers, educators, and the general citizenry. The task is formidable, but the increases in understanding obtained over the past decade give one some reason for optimism.

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About the Authors

Carole Klopp is the Director of the National Service-Learning Exchange, a national peer-based training and technical assistance project sponsored by the National Youth Leadership Council with funding from the Corporation for National Service. Prior to joining the staff of NYLC, Ms. Klopp was an educational consultant/trainer in the areas of service-learning, whole brain learning, developmental assets, and resiliency. She currently presents locally, regionally, and nationally on service-learning and whole brain learning.

Pamela Toole, Ph.D., has worked with students at every level from upper elementary through graduate school. She is currently the vice president of Compass Institute , a nonprofit organization and a lecturer at the University of Minnesota School of Social Work and Youth Studies. Her base of practice and experience come from having coordinated and then directed youth service programs in the California K-12 schools. Upon moving to Minnesota, Pamela directed Professional Development at the National Youth Leadership Council (NYLC). Through this work she has led service-learning workshops for educators in over 40 states and helped to develop a publication on the essential elements of service-learning practice for teachers and for the districts supporting them.

James Toole, Ph.D., has been a classroom teacher at the elementary, middle school, and high school levels. He is currently on the staff of the University of Minnesota School of Social Work and Youth Studies. He is also the president of Compass Institute, a nonprofit that works with schools and community-based organizations. His dissertation focused on the implementation of service-learning at seven K-8 schools located in different regions of the United States. His base of practice and experience come from having directed youth service programs in the California public schools. Upon moving to Minnesota he co-directed the National Youth Leadership Council's Professional Development department with his wife Pamela. Through this work and his Compass Institute work, he has led service-learning workshops for beginners to advanced practitioners in over 40 states.

Corporation for National Service
Learn and Serve America Program, Department of Service-Learning
1201 New York Avenue, NW, Washington, DC 20525
Telephone: 202-606-5000 Web site: http//www.nationalservice.org

National Dropout Prevention Center
College of Health, Education, and Human Development
Clemson University , 209 Martin Street, Clemson, SC 29631-1555
Telephone: 864-656-2599 e-mail: ndpc@clemson.edu
Web site: http://www.dropoutprevention.org